



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,268	12/09/2003	Luying Sun	4920-104 US	4722
7590 03/27/2008				
Patrick H. Higgins				
Mathews, Collins, Shepherd & McKay				
Suite 306				
100 Thanet Circle				
Princeton, NJ 08540				
EXAMINER				
WEINER, LAURA S				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
03/27/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/731,268

**Applicant(s)**

SUN, LUYING

**Examiner**

/Laura S. Weiner/

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 13 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 8-16 and 22-33 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 8-16, 22-33 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 2-13-08 has been entered.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 8-16, 29-33; 22-28 have been considered but are moot in view of the new ground(s) of rejection. The rejection of claims 8-16, 30-33; 22, 24-28 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tabuchi et al. (JP 2000-067913, translation) has been withdrawn. The rejection of claims 8-16, 30-33; 22, 24-28 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Hayashi et al. (JP 2000-164249, translation) have been withdrawn. The rejection of claims 23 and 29 under 35 U.S.C. 103(a) as being unpatentable over Hayashi et al. (JP 2000-164249, translation) has been withdrawn.

***Response to Arguments***

3. Applicant's arguments filed 12-31-07 have been fully considered but they are not persuasive in regard to claims 8-16, 30-33 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishikawa et al. (JP 2000-113906, translation). This is because Nishikawa et al. teaches an electrolyte solution comprising EC and ME-OC=O-O-(CH<sub>2</sub>)<sub>2</sub>-CN which is exactly what is being claimed NC-CR1R2-X where X is ME-OC=O-O-. There for the rejection stands.

***Claim Rejections - 35 USC § 112***

4. Claim16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no support for the molecular weight of the nitrile being smaller than 200.

***Claim Rejections - 35 USC § 102***

***Claim Rejections - 35 USC § 103***

5. Claims 8-16, 30-33 are rejected under 35 U.S.C. 102(b as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Nishikawa et al. (JP 2000-113906, translation).

Nishikawa et al. teaches an electrolyte solution comprising EC and Formula (V),  $R1'-COO-(CH_2)_a-CN$  where R1 can be an alkyl group [teaching Formula (Ib)].

Nishikawa et al. teaches on page 3, [0013] of translation, that selecting the amount of polar solvent besides the above, and/or a cyano ethyl ether system quantity dielectric constant solvent in 5-95% by weight of the range among electrolytic solution solvent total amounts. Nishikawa et al. teaches on page 4 of translation, that the electrolyte salt was LiPF<sub>6</sub>.

Since Nishikawa et al. teaches the same electrolyte comprising a cyclic carbonate, a nitrile compound and a LiPF<sub>6</sub> salt then inherently the same electrolyte having an ionic conductivity of greater than  $9 \times 10^{-3}$  S/cm at about 25 degrees C having an ionic conductivity of greater than  $1 \times 10^{-3}$  S/cm at about -30 degrees C, having an ionic conductivity of greater than  $3 \times 10^{-4}$  S/cm at about -50 degrees C, the weight loss of the electrolyte is less than 3% after heated at 90 degrees C for 2 hours, the weight loss of the electrolyte is less than 5% after heated at 90 degrees C for 4 hours, the freezing point of the electrolyte is less than -60 degrees C and the boiling point of the nitrile higher than 120 degrees C and flash point is higher than 60 degrees C must also be obtained.

In addition, the presently claimed property of having an ionic conductivity of greater than  $9 \times 10^{-3}$  S/cm at about 25 degrees C having an ionic conductivity of greater than  $1 \times 10^{-3}$  S/cm at about -30 degrees C, having an ionic conductivity of greater than  $3 \times 10^{-4}$  S/cm at about -50 degrees C, the weight loss of the electrolyte is less than 3% after heated at 90 degrees C for 2 hours, the weight loss of the electrolyte is less than

5% after heated at 90 degrees C for 4 hours, the freezing point of the electrolyte is less than  $-60$  degrees C and the boiling point of the nitrile higher than 120 degrees C and flash point is higher than 60 degrees would have obviously have been present once the Nishikawa et al. product is provided. *In re Best*, 195 USPQ 433 (CCPA 1977).

6. Claims 8-16, 30-33; 22, 24-28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kobayashi et al. (JP 2000-077096, translation and abstract).

Kobayashi et al. teaches an electrolyte battery comprising a positive electrode comprising a lithium content multiple oxide such as  $\text{LiCoO}_2$ , and a negative electrode which includes a carbon material and a separator. Kobayashi et al. teaches an electrolyte comprising  $\text{LiPF}_6$ , a 60%  $\text{CH}_3\text{OCOOC}_2\text{H}_4\text{CN}$  compound in Example 8, and 40% EC. Kobayashi et al. teaches that the electrolyte can comprise  $\text{LiPF}_6$ ,  $\text{LiBF}_4$ , etc or two or more sorts can be mixed.

Since Kobayashi et al. teaches the same electrolyte comprising a cyclic carbonate, a nitrile compound and a  $\text{LiPF}_6$  salt then inherently the same electrolyte having an ionic conductivity of greater than  $9 \times 10^{-3}$  S/cm at about 25 degrees C having an ionic conductivity of greater than  $1 \times 10^{-3}$  S/cm at about  $-30$  degrees C, having an ionic conductivity of greater than  $3 \times 10^{-4}$  S/cm at about  $-50$  degrees C, the weight loss of the electrolyte is less than 3% after heated at 90 degrees C for 2 hours, the weight loss of the electrolyte is less than 5% after heated at 90 degrees C for 4 hours, the freezing point of the electrolyte is less than  $-60$  degrees C and the boiling point of the

Art Unit: 1795

nitrile higher than 120 degrees C and flash point is higher than 60 degrees C must also be obtained.

In addition, the presently claimed property of having an ionic conductivity of greater than  $9 \times 10^{-3}$  S/cm at about 25 degrees C having an ionic conductivity of greater than  $1 \times 10^{-3}$  S/cm at about -30 degrees C, having an ionic conductivity of greater than  $3 \times 10^{-4}$  S/cm at about -50 degrees C, the weight loss of the electrolyte is less than 3% after heated at 90 degrees C for 2 hours, the weight loss of the electrolyte is less than 5% after heated at 90 degrees C for 4 hours, the freezing point of the electrolyte is less than -60 degrees C and the boiling point of the nitrile higher than 120 degrees C and flash point is higher than 60 degrees would have obviously have been present once the Kobayashi et al. product is provided. *In re Best*, 195 USPQ 433 (CCPA 1977).

7. Claims 8-16, 30-33; 22, 24-28 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Toriida et al. (JP 2000-243442, translation).

Toriida et al. teaches that the electrolyte comprises  $\text{LiBF}_4$ ,  $\text{LiPF}_6$ , etc. Toriida et al. teaches that the electrolyte contains a solvent containing 0.01-70% by weight of cyanoethyl group  $\text{R}(\text{O})_n\text{COOCH}_2\text{CH}_2\text{CN}$  and contains a cyclic carbonate. The negative electrode includes metal lithium, carbon material and a cathode comprising a multiple oxide of lithium such as  $\text{LiCoO}_2$ . Toriida et al. teaches in Example 1, that the electrolyte comprises PC:DEC=55:45 and 1 M of  $\text{LiPF}_6$ .

Since Toriida et al. teaches the same electrolyte comprising a cyclic carbonate, a nitrile compound and a LiPF<sub>6</sub> salt then inherently the same electrolyte having an ionic conductivity of greater than  $9 \times 10^{-3}$  S/cm at about 25 degrees C having an ionic conductivity of greater than  $1 \times 10^{-3}$  S/cm at about -30 degrees C, having an ionic conductivity of greater than  $3 \times 10^{-4}$  S/cm at about -50 degrees C, the weight loss of the electrolyte is less than 3% after heated at 90 degrees C for 2 hours, the weight loss of the electrolyte is less than 5% after heated at 90 degrees C for 4 hours, the freezing point of the electrolyte is less than -60 degrees C and the boiling point of the nitrile higher than 120 degrees C and flash point is higher than 60 degrees C must also be obtained.

In addition, the presently claimed property of having an ionic conductivity of greater than  $9 \times 10^{-3}$  S/cm at about 25 degrees C having an ionic conductivity of greater than  $1 \times 10^{-3}$  S/cm at about -30 degrees C, having an ionic conductivity of greater than  $3 \times 10^{-4}$  S/cm at about -50 degrees C, the weight loss of the electrolyte is less than 3% after heated at 90 degrees C for 2 hours, the weight loss of the electrolyte is less than 5% after heated at 90 degrees C for 4 hours, the freezing point of the electrolyte is less than -60 degrees C and the boiling point of the nitrile higher than 120 degrees C and flash point is higher than 60 degrees would have obviously have been present once the Toriida et al. product is provided. *In re Best*, 195 USPQ 433 (CCPA 1977).

***Claim Rejections - 35 USC § 103***



8. Claims 23 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al. (JP 2000-077096, translation and abstract).

Kobayashi et al. teaches an electrolyte battery comprising a positive electrode comprising a lithium content multiple oxide such as  $\text{LiCoO}_2$ , and a negative electrode which includes a carbon material and a separator. Kobayashi et al. teaches an electrolyte comprising  $\text{LiPF}_6$ , a 60%  $\text{CH}_3\text{OCOOC}_2\text{H}_4\text{CN}$  compound in Example 8, and 40% EC. Kobayashi et al. teaches that the electrolyte can comprise  $\text{LiPF}_6$ ,  $\text{LiBF}_4$ , etc or two or more sorts can be mixed.

Kobayashi et al. teaches the claimed invention except does not specifically teach that the electrolyte salt comprising a mixture of 50:50  $\text{LiPF}_6$  and  $\text{LiBF}_4$ .

It would have been obvious to one having ordinary skill in the art at the time the invention was made to use both salts,  $\text{LiPF}_6$  and  $\text{LiBF}_4$  in the electrolyte taught by Hayashi et al. because it is prima facie obvious to combine two compositions each of which is taught by prior art to be useful for the same purpose in order to form a third composition that is to be used for the very same purpose. See *In re Kerkhoven*, 205 USPQ 1069; *In re Susi*, 169 USPQ 423.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /Laura S. Weiner/ whose telephone number is 571-272-1294. The examiner can normally be reached on M-F (6:30-4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Laura S Weiner/  
Primary Examiner  
Art Unit 1795

March 13, 2008